Proposal 1666 changes vs. amendments to draft 1. CDPaccess removed strikeout/underline notation when the proposal was re-edited, so here us a legal markup relative to the current posting for public review. The yellow highlighted text are the additional modifications suggested by the Modeling SC.

**C406.2 . . .**

Energy credits achieved for the project shall be the sum of the individual measure’s energy credits. Credits are available for the measures listed in this Section. Where a project contains multiple building occupancy groups:

1. Credits achieved for each occupancy group shall be summed and then weighted by the conditioned floor area of each occupancy group to determine the weighted average project energy credits achieved.

2. Improved envelope efficiency (E01 through E06), HVAC Performance (H01), and lighting reduction (L06) measure credits shall be determined for the building or permitted conditioned floor area as a whole. Credits for other measures shall be determined for each occupancy separately. Credits shall be taken from applicable tables or calculations for each occupancy and weighted by the building occupancy group floor area.

**C406.2.2.1 H01 HVAC Performance (TSPR).**

H01 energy credits shall be earned where systems are permitted to use Section C409 and where the savings (TSPRs) based on the proposed TSPR (TSPRp) compared to the target ~~exceeds the minimum~~ TSPR (TSPRt) ~~requirement~~ is 5 percent or more. If ~~improvement~~ savings is greater than 5 percent, determine H01 earned credits using Equation 4-14. Energy credits for H01 shall not be combined with energy credits from HVAC measures H02, H03 or H05.

~~H01 energy credit = H01 base energy credit x TSPRs / 0.05~~

ECTSPR = ECBASE x ~~TSPRa~~AREATSPR x TSPRs / 0.05 (Equation 4-14)

where:

ECTSPR = Energy credits achieved for H01

ECBASE = H01 base energy credits from Tables C406.2(1) through C406.2(9)

TSPRs ~~x~~ = ~~TSPRa x~~ ~~[~~the lessor of 0.20 and (1 - (TSPRt ~~p~~ / TSPRp ~~t~~))~~]~~

~~where:~~

~~TSPRa~~AREATSPR = [floor area served by systems ~~permitted to use~~ included in TSPR] / [total building conditioned floor area]

TSPRp = HVAC TSPR of the proposed design calculated in accordance with Sections C409.4, C409.5 and C409.6.

TSPRt = TSPRr / MPF

~~where:~~

TSPRr = HVAC TSPR of the reference building design calculated in accordance with Sections C409.4, C409.5 and C409.6.

MPF = Mechanical Performance Factor from Table C409.4 based on climate zone and building use type.

Where a building has multiple building use types, MPF shall be area weighted in accordance with Section C409.4

Reason:

Review and testing of the formula for TSPRs found three issues that this proposal corrects:

1. The subscript TSPRx is incorrect and changed to TSPRs for TSPRsavings

2. TSPRp and TSPRt were reversed in the formula for TSPRs resulting in a negative result and a fraction representing improvement in TSPR rather than the savings indicated by the improvement in TSPR. The corrected core formula for TSPRsavings is: 1 - (TSPRt / TSPRp).

As an example, for a typical improvement case, the current TSPRs formula would return -12.6% savings when the TSPR improvement was 12.6%, and the actual savings in site energy use was 11.2%. The corrected formula returns 11.2%.

3. The adjustment for building area included in the TSPR calculation (TSPRa) was moved to the main formula so that TSPRs can be properly referenced to be in the range of 0.05 to 0.20 for setting measure eligibility limits.

Two symbols were added for the base and earned energy credits to match the format of other measure adjustment formulas. In addition, charging language was clarified to indicate the minimum 5% is a savings from TSPR improvement rather than the TSPR improvement itself. Also, the mixed-use section was modified to include measure H01 with those measures that are calculated for the project as a whole.

NOTE that CDPaccess did not retain strikeout and underline in these corrections, so a file is attached that shows all changes from the second round IECC posting.

There was a question during the SC call asking about the correction to TSPR savings formula (correction #2 above). Here is a more detailed explanation of why the correction is needed.

The base credits for using TSPR are based on achieving a minimum 5% improvement over the target HVAC systems. Additional credits can be earned for additional TSPR savings up to 20%. Remember that the TSPR metric increases as an HVAC system gets more efficient. Let’s take an example where the target system has a TSPR value of say 95. In order to qualify for this credit a proposed HVAC system would have to have a TSPR of 100, a 5% improvement. Let’s use these two numbers in the corrected formula above for TSPR savings.

The corrected formula is 1- (TSPR target / TSPR proposed) = 1 – (95/100) = 0.05 or 5%

The incorrect formula was 1-(TSPR proposed/TSPR target) = 1 – (100/95) = -0.052 as you can see this results in a negative number which would not work in Equation 4-14.